

CLAIMS

1. Metal complex of the general formula $M(L)_n$, wherein each L is independently selected and represents a ligand and
5 at least one L is vitamin B₁₂ (cyanocobalamin) or a derivative thereof which is bound through the nitrogen atom of its cyanide group to M, which is an element selected from the transition metals, thus, forming a M-NC-[Co] moiety wherein [Co] represents vitamin B₁₂ without cyanide and wherein n is
10 1, 2, 3, 4, 5 or 6.

2. Metal complex as claimed in claim 1, wherein the transition metal is selected from technetium, ruthenium, rhodium, rhenium, palladium, platinum, iridium and copper.

3. Metal complex as claimed in claim 1 or 2, wherein
15 the metal is a radioisotope of the elements Re or Tc, such as ^{99m}Tc, ¹⁸⁸Re, ¹⁸⁶Re.

4. Metal complex as claimed in any one of the claims 1-3, wherein when M is technetium or rhenium, the other ligands comprise three carbonyl groups (CO's) and optionally
20 a bidentate ligand, optionally coupled to another metal complex or other molecule, such as a biologically active molecule or fluorescing agent.

5. Metal complex as claimed in claim 4, wherein the bidentate ligand is selected from two aliphatic and/or
25 aromatic amine parts or one aliphatic or aromatic amine part and an anionic group such as a carboxylate, a thiolate or a hydroxylate.

6. Metal complex as claimed in claim 5, wherein the bidentate ligand is selected from α -amino acids or
30 derivatives of picolinic acid.

7. Metal complex as claimed in any one of the claims 1-3, wherein when M is platinum, L is independently selected from ligands containing N, S, P, O, C as the metal binding

atom or any other donor with one non-binding electron pair available for coordination to the metal, optionally coupled to another metal complex or another molecule, such as a biologically active molecule or a fluorescing molecule.

5 8. Metal complex as claimed in any one of the claims 4 or 7, wherein the other molecule is selected from fluorescing agents, pharmacophores with cytotoxic, cytostatic or other pharmacological activities, optical dyes, NIR dyes or phosphorescent dyes.

10 9. Metal complex as claimed in claim 8, wherein the fluorescing agent is selected from fluoresceine, pyrene, acridine, dansyl.

 10. Metal complex as claimed in claim 8, wherein the cytotoxic agent is tamoxifen, methotrexate or
15 cyclophosphamid.

 11. Metal complex as claimed in any one of the claims 1-10 having a structural formula as depicted in **Figure 2**.

 12. Process for preparing a metal complex as claimed in any one of the claims 1-11, comprising mixing of vitamin
20 B_{12} with a precursor complex of the general formula $M(L)_{n-1}L'$, wherein M is a transition metal, n is 2, 3, 4, 5 or 6, L' is a ligand to be substituted by vitamin B_{12} or a derivative thereof, and each L is independently selected and is a ligand, to obtain a metal complex with a stable [Co]-CN-M
25 bridge.

 13. Precursor complex having the general formula $M(L)_{n-1}L'$, wherein M is a transition metal, n is 2, 3, 4, 5 or 6, L' is a ligand to be substituted and each L is independently selected and is a ligand for use in the
30 preparation of metal complexes as claimed in any one of the claims 1-11.

 14. Precursor complex as claimed in claim 13 having a structural formula as depicted in **Figure 1**.

15. Metal complex as claimed in any one of the claims 1-11, for use in radiodiagnostics, chemotherapy or radionuclide therapy.

16. Metal complex as claimed in any one of the claims
5 1-11, wherein M is a catalytically active metal for use in catalysis.